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ABSTRACT

College political science departments can derive several benefits by offering computer utilization and survey research courses to secondary social science teachers. Presently, attitudes of both teachers and students toward the relationship between the "hard sciences" and the social sciences account for the lack of computer utilization in that area on the secondary level. Problems are created for political scientists as a result of these attitudes since many political science courses are in part quantitative. Also, the lack of contact with political science departments make secondary teachers unaware of political science course offerings. Currently, a course for secondary social science teachers at Youngstown State University combines the development of computing and quantitative skills concurrently with the teaching of elementary survey research skills. Teachers are taught to manipulate computer television terminals for processing data, and attempt to write their own programs. They also learn how to design a survey questionnaire, draw a sample, gather data, convert data to readable computer form, and present results. Benefits are that teachers who attend these courses are a valuable source for influencing high school students to major in political science, many students will enter political science courses with quantitative skills, and political scientists could use local schools for field research. (KC)

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Establishing Working Relationships with Secondary School Teachers

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Prepared for presentation at the 1979 Annual Meeting of the American Political Science Association.

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Establishing Working Relationships
with Secondary School Teachers

Many school districts across the country are incorporating computing facilities into secondary schools so that high school students may acquire some degree of "computer literacy" (Bukoski and Korotkin, 1976; Kibler and Campbell, 1976; Holzman and Glaser, 1977). Even in those districts where computer facilities are not provided in the district itself, individual teachers are acquiring computer terminals for remote access to computer installations outside the district.[1]

The focus of computer literacy courses in secondary schools until recently has been in actual computer science instruction incorporated into "hard science" programs in mathematics, physics, chemistry and so on. These courses usually attempt to teach the rudiments of a programming language and the development of gaming skills (Dwyer, 1975; Roman and Heller, 1974). Instruction is primarily interactive between student and computer (Bukoski and Korotkin, 1976).

Until recently, secondary schools have avoided computer utilization by social science departments (Bukoski and Korotkin, 1976: 15). Indeed, the reasoning here was that social science teachers are unable to effectively teach computer applications in social science subjects, that high school social science majors lack quantitative skills or aptitude for computer work; and that quantitative skills especially involving computers are probably of little value to high school social scientists.

This lack of attention to social science computing needs in high schools is rapidly changing.[2] The result of this change has led many secondary schools to reach outside their organizations for help in setting up social science programs with computer applications. In many cases social science teachers

and administrators with computing skills are in great demand in school districts implementing more computer oriented programs (e.g. Kibler and Campbell, 1976).

The purpose of this paper is to argue that political scientists in colleges and universities would be wise to establish linkages with school districts in and around their areas; because in so doing, it may be possible for political science departments to increase their enrollments and upgrade the quantitative skills of high school students entering political science programs. The paper will (1) offer some evidence for why computer utilization in secondary schools is not geared toward social sciences, (2) show how computer utilization by secondary school social science departments can be initiated and maintained by offering special college level courses for social science teachers and (3) highlight potential benefits which political science departments may derive by becoming involved in secondary school computer utilization.

Social Science Computer Utilization and Secondary Schools

The absence of demand for computer facilities by secondary school social science departments seems to be a function of attitudes of both students and teachers. In the case of high school students, by the time a student reaches high school, he has probably been recruited either into the group of students who have an aptitude for the "hard sciences" or into the group that feels more comfortable with social sciences and humanities (March, 1972). In the former group, courses in computer science, mathematics, statistics and so on make high school interesting, exciting or useful for some students, whereas in the latter group, even the words computer science, mathematics and statistics are "dirty" words and courses in these areas are to be avoided.[3]

For secondary social science teachers, a similar situation arises. Most social science teachers were themselves self-selected or directed into the social sciences and humanities in ways similar to those of their students above.

Once in college, they gravitated toward courses which stress "foundations of education" topics, but which excluded any quantitative or computational skill development. The result of this self-selection is that for social science teachers, computer science, mathematics and statistics are dirty words. (Heines, 1975; Buss, et al, 1978a).

Not suprisingly, then, local school districts in the past have not sought to incorporate computer literacy for social science and humanities majors in secondary schools.

Some Problems for Political Scientists

The results of patterns of learning and teaching in social science secondary schools seem to have detrimental long term effects upon college political science departments. First, many political science departments now offer programs which are at least in part quantitative (computing being only one facet of a program), especially in upper division courses or in departments having large graduate programs (e.g. Weatherford, 1978; Pool, 1976). Students in secondary schools who have an aptitude and desire to develop quantitative skills will already be committed to "hard science" programs when coming to college so that many of this valuable group may be lost to political science. Students who have no aptitude or desire for quantitative pursuits in high school either will opt for social science or humanities programs which do not stress quantitative skills; or will avoid quantitative courses as much as possible. It seems that the results of this self-selection may lead to smaller political science enrollment overall; and for specific political science courses, enrollment in methodology, statistics and quantitative courses may be lower than for other courses (Buss, et al, 1978a).

Second, secondary school teachers in general do not make contact with college faculty to pursue mutual interests, help high school students, or keep abreast of current developments in their respective fields (Buss, et al, 1978a). In

many cases they feel like second-class academic citizens with nothing in common with their college counterparts. This fact coupled with the secondary school teacher avoidance of any courses stressing quantitative pursuits suggests that teachers will not be aware of the offerings of political science departments and that teachers may not encourage their own students to pursue political science majors in college. Again, political science enrollments may suffer because high school students may not be reached soon enough in their high school careers to be drawn into political science departments.

Initiating Linkages with Secondary Schools

One way which our political science department has found useful in initiating linkages with secondary school teachers is to offer a graduate (or undergraduate) course for social science teachers.[4] A course syllabus is given in an Appendix. The course attempts to upgrade teacher computing and quantitative skills; promote the development of projects that can be used by the teacher to interest and inform high school students; allow teachers to offer feedback on their experiences, what works and what does not, and the usefulness of various projects; and establish formal channels for the sharing of information among teachers and political science faculty.

Our course combines the development of computing and quantitative skills concurrently with the teaching of elementary survey research skills. In the computing portion of the course, teachers are taught to use computer television terminals for processing data. Teachers begin by learning how to manipulate the computer using simple games and simulations. Once familiar with the terminal, teachers move on to elementary programming using VSBASIC to solve various kinds of simple computing problems. Finally, teachers attempt to write their own programs with assistance of instructors. These various computing skills are taught so that teachers can immediately apply them in their own classes using their own computing facilities in their districts. Instructors also assist

teachers in converting learning materials from our computer system to the school district system. In those cases where computing facilities were not available, teachers were assisted in preparing need assessments and grant applications for securing remote terminal access capability.[5]

In the survey research portion, teachers are taught how to design a survey questionnaire, draw a sample, gather data, convert the data to computer readable form, and present their results using elementary statistical techniques. This portion of the course resembles any applied undergraduate research methodology course. The survey research portion of the course gives the teacher a vehicle for stimulating high school students to learn about gathering and analyzing data.

Of course, specific courses are likely to vary depending upon computing facilities, teacher needs and program goals. Experience gained in our course suggests that the following considerations should be important in teaching any course in quantitative political science to teachers. First, course topics should be applied or practical, rather than theoretical or conceptual. Second, course topics should be relevant to high school social science curricula. Third, teachers must be able to apply what they have learned in class directly to their own classes. Fourth, the level of sophistication represented in the course must be low, not because of teachers abilities, but because of the usefulness of course materials for high school students. Fifth, political scientists must be willing to assist in directly implementing course materials into teacher classes. Sixth, and perhaps most importantly, course instructors should attempt in every way possible to dissuade any apprehension teachers may have in taking a quantitative skills course; a bad experience here could eliminate any future participation by these or other teachers.

Some Suggestions for Maintaining Linkages with Secondary Schools

Once an initial course has been offered, contact with the school districts may be maintained in many ways. Some of these might include:

*Providing the same course periodically for teachers who require rudimentary skills.

*Providing followup courses for teachers who wish to upgrade their skills.

*Recruiting high skill teachers or consultants and assistants in these courses.

*Offering time sharing of computer facilities to school districts at the university commercial rate.

*Providing an archive from which teachers could access political science data sets.

*Encouraging teachers to bring their students to political science departments to show advantages of being a political science major.

*Having political science faculty serve as paid consultants in school district projects.

*Performing research in secondary schools with the assistance of teachers.

*Expanding local efforts into more regional efforts.

Discussion

Courses of the type above can be very beneficial to political science departments in terms of major benefits derived over the short and long term. Secondary school teachers in social studies departments are a renewable source of students in and of themselves. Most states require additional college level work for teachers. The requirements are usually fulfilled by education courses. But, courses as described here may fulfill similiar requirements. Once teachers begin such a course, they may return to the university to upgrade, supplement or revise their skills. And as unskilled teachers are recruited into the school district, course cycles can be repeated. At present, this source of non-traditional students in political science has not been exploited.

Teachers who attend these courses are also a valuable source for influencing high school students. Imagine if each teacher in a 15-person class recruits at least one student from their own class to be political science majors. Over several years' time, many more high school students might be drawn into political

science. This would be especially true if high school students were invited to political science departments and if channels of communication were opened and maintained.

It may be unreasonable to expect that all high school students becoming political science majors would enter college with even elementary quantitative skills. But it may be possible for many to enter political science with some quantitative skills which they have learned from teachers in political science courses. As a result, departments could offer more advanced courses which would give prepared students even higher skill levels on graduation.

Finally, many political science researchers frequently find difficulty in using local schools for field research. But this problem may be ameliorated once local schools become acquainted with those doing the research. In order to utilize local school teachers and students who are valuable, yet neglected resources, courses as those above seem to provide access where access may have been previously denied.

Notes

1. For example, in Ohio, teachers may secure grants to purchase remote television terminals for their schools under the "Teacher and Unit Grant Program," Ohio Department of Education.
2. Information publicized in a roundtable discussion at the nationwide Annual Director's Meeting of The National Science Foundation, Pre-College Teacher Development in Science Program, April 27-28, 1978, Washington, D.C.
3. Data supporting these conclusions was based upon interviews with administrators and teachers in Columbiana, Trumbull and Mahoning Counties in Ohio and upon student followup studies by the Mahoning County Board of Education. Survey data analysis is available in Terry F. Buss, William C. Binning and Michael K. Householder, Social Science Research Methods with Computer Applications: A Final Report to the National Science Foundation (forthcoming).
4. The course described herein was supported by a grant (#78-04524) from the Pre-College Teacher Development in Science Program of The National Science Foundation. A handbook outlining course materials may be found in Terry F. Buss and Michael K. Householder, A Handbook of Social Science Research Methods with Computer Applications (forthcoming).
5. See note 1 above.

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Appendix

I. Computer Utilization*

Topic A. Familiarization with television terminal using gaming techniques.

Topic B. Introduction to BASIC program language.

Topic C. Interactive processing of problems handed out to students.

Topic D. Interactive processing of problems made up by students.

Topic E. Demonstrations of computer capabilities.

Topic F. Demonstration of computer processing on machines in students' hi school.

Topic G. Discussions about implementing teaching materials in high school science classes.

II. Survey Research*

Topic A. Survey research design: telephone and personal interviews.

Topic B. Executing the research design: sampling, interviewing.

Topic C. Data management: converting data into machine readable form, codi

Topic D. Data analysis: simple statistical analysis.

Topic E. Reporting study results.

Topic F. Ethical considerations in survey research.

Topic G. Discussions about implementing teaching materials in high school science classes.

*Both sections offered concurrently.